

Philippines Office Building Energy Efficiency Project

April 2001 Update

Under the auspices of the Philippines Department of Energy, US EPA is working in Manila to support building owners and managers in their efforts to reduce operating costs and make their buildings more comfortable for occupants through improved energy efficiency.

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Thanks!

The team for the US EPA's Philippines Building Energy Efficiency Program was in town in December 2000. We met with 13 of our partner organizations, including 3 lighting equipment manufacturers and made a presentation at the ENMAP conference. We were gratified to learn about the progress that had been made since our last visit.

Partner Achievement

What's better than a good retrofit? How about starting with efficient equipment?

The most notable partner success to date is a decision made by the Colliers Jardine management of the new RCBC Plaza building in Makati to specify 32W T8 lamps with high-frequency electronic ballasts. Compared to T12 lamp systems, this change reduces energy use, improves lighting quality, and requires less frequent lamp and ballast replacements compared to the lighting equipment originally planned for the building. We estimate that the change will save more than 1,305,000 kWh/year in lighting electricity consumption and another 200,000 kWh/year from reductions in the cooling load. This translates into peak load reductions of about 360 kW. The change will also result in cost savings to tenants and building owners of 67 million Pesos over 10 years.

A Great Connection

The Philippines Long Distance Telephone Company has also shown leadership in moving forward with a demonstration project in which a portion of a building has been retrofitted to 32W T8s and will be closely

monitored to verify savings. We are hoping to prepare a case study so everyone can learn from PLDT's demonstration project.

Demonstration Projects

Other partners, including the Jaka Group and the Locsin Condominium, have decided to install energy-efficient lighting equipment as demonstration projects in their facilities based on technical assistance from EPA. These initial upgrades, along with PLDT's, will retrofit about 900 fixtures and will produce annual savings of 471,000 Pesos. These projects have internal rates of return ranging from 25% to 45%. The projects are located in buildings having a total floor area of 235,826 square meters. If the owners move to retrofit each building completely it would involve upgrading over 44,000 additional fixtures.

Lighting Retrofits

Lighting retrofitting refers to the act of changing the equipment within a luminaire. A retrofit can mean adding a reflector or reducing the number of lamps, but usually it means changing the lamp type and ballast to more efficient options.

We have worked with 5 sets of owners and property managers in Metro Manila to analyze the economics of lighting upgrades and demonstration projects. While there are several retrofit options to replace old T12s, we believe the 32W linear T8 lamp with a high-frequency electronic ballasts is superior in most cases, using about 35% less energy (in a 2-lamp fixture).

36W T8s don't offer the same degree of savings, reducing the wattage by only about 17%. Sticking with magnetic ballasts misses the opportunity for reducing ballast loss.

T5 systems offer the best saving, producing the same light levels as T12s with less than half of the energy. However, T5s are not as good a retrofit option because the entire fixture must be replaced to get the best results.

To assist with upgrading to 32W T8s and high-frequency ballasts, we have worked with local offices of lighting manufacturers to create a Procurement Guide. A copy of the guide is included with this Update.

Mini-Conference on Lighting

We are planning a small conference in June 2001 that will have 2 parts. We hope that everyone will be able to participate.

- 1) The General Session will bring together all of our partners and stakeholders, offering a manager-level view of our activities and plans, and recognizing leading partners.
- 2) The half-day Technical Workshop on Lighting Retrofits will bring together the experience of our partners, focusing more on the details of making successful lighting retrofits in Manila.

Building Energy Efficiency Mini-Conference – planned for the week of June 18, 2001. Exact time and date to be announced.

Lighting and Cooling Loads

When lights are upgraded, they use less energy and therefore less energy is brought into the building. This means that more of the electricity is converted into light and there is less heat from the ballast. While this is logically true, how can it be quantified?

A precise calculation requires multiple input values and some expensive professional engineering work, but we have developed a simple rule of thumb that applies to typical high-rise office buildings.

Generally, every kW of reduced lighting load (about 30 2-lamp fixtures converted from T12 to 32W T8 with high-frequency electronic ballast), which saves about 2,800 kWh/year in lighting energy, could reduce cooling energy by 611 kWh/year. Also, when chiller upgrades are planned, each kW of reduced lighting load means 0.2 tons less of chiller capacity is needed.

(Lighting Bulletin No.6, April 1994, Lighting Information Office, EPRI. Copies available upon request.)

Energy Savings Improve Reliability

Our analyses usually focus either on direct financial benefits or long-term environmental benefits, but there is another direct benefit that is good for everyone.

Load reductions, especially reductions in peak loads, improve electric supply reliability by reducing the stress on the electrical system. Whether the system's weakest link is in generation, transmission, or local distribution, unconstrained growth in demand for electricity will eventually find the weakness and cause problems such as blackouts.

The benefits to the community and the economy for avoiding power crises are large, including avoiding lost productivity, maintaining the quality of life, and ultimately controlling the cost of electricity. A study by the Regulatory Assistance Project found that the overall value of reducing peak loads through energy efficiency can be as much as 10 times the direct energy savings from the building where the upgrades are performed.

Benchmarking

Benchmarking buildings is a way of comparing their energy efficiency using energy consumption, adjusted for differences in building size, occupancy, and operating hours. The US EPA has benchmarked thousands of buildings across the United States.

In December, we delivered benchmarking scores for 13 buildings to partners in Manila. Despite the similarities in the building systems equipment, we found that there were also many differences in building design, operating practices, and building comfort preferences. We provided the range of scores from Manila with the expectation that comparing benchmarked buildings to local buildings would be more meaningful.

To better understand the differences, we visited 8 of the 13 benchmarked buildings, measuring temperature, humidity, CO₂, and light levels in representative spaces for each building. We will report back to the managers of the buildings we visited. In the meantime, we are developing a body of data that will be useful in future efforts to improve whole-building energy efficiency.

How to Contact ITP staff:

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Commercial Lighting Procurement Guide

32-Watt Linear T8 Lamps and High-Frequency Electronic Ballasts

Philippines Office Building Energy Efficiency Project
US Environmental Protection Agency

Using this guide

This guide is designed to assist with procurement of 4-foot linear fluorescent lamps and high-frequency electronic ballasts primarily for retrofit applications in 220v and 277v systems. Retrofit refers to changing lamps and ballasts without replacing the entire fixture. The suggested technologies, high-frequency 32-Watt T8 lamps and high-frequency electronic ballasts, offer greater energy efficiency and higher quality illumination without sacrificing light levels. In order to achieve energy savings and reliable operation, the lamps must be used with electronic ballasts specified to operate the high-frequency 32-Watt T8 lamp.

High Frequency Electronic Ballast (Gear) Specifications (to be used with 4-foot high-frequency 32-Watt T8 lamp)

Performance Characteristic	Specification (requirement)	Notes
Ballast Type	High-Frequency Electronic	
Mains (Building System) Frequency	50/60 Hz	Make sure the correct frequency is specified.
Mains (Building System) Voltage	220v/277v	Choose ballasts that match the voltage of your mains.
Total Harmonic Distortion (THD)	< 33%	Acceptable THD levels depend on the amount of sensitive electronics on your electrical system.
Voltage Tolerance	± 20% of mains voltage	This is especially important if voltage fluctuations are frequent.
Lamp Operating Frequency	> 20 kHz	
Power Factor (PF)	≥ .90	If fixtures include PF correction devices for magnetic ballasts, they should be removed when high PF electronic ballasts are installed.
Ballast Factor	.85 – 1.00	Choose a lower ballast factor if the area is overlit and save more energy.
Lamps/ballast	1 to 4	It may be possible in some cases to replace multiple magnetic ballasts with a single electronic ballast. Ballasts should always be specified for the number of lamps they will drive. Consult your lighting supplier or electrical contractor.
Circuit type	Instant-start or rapid-start	Instant-start is generally more efficient, but rapid-start is better if the lights are frequently switched on and off, as is the case when using occupancy sensors.
Current Crest Factor	< 1.7	
Manufacturer Warranty	At least three years	

32-Watt Linear T8 Fluorescent Lamp Specifications

Performance Characteristic	Specification (requirement)	Notes
Fluorescent Lamp Type	High-frequency linear T8	
Lamp Length	4 Feet (1200 mm)	Other lengths of HF T8 lamps are expected to be available in the Philippines in the near future. When planning retrofits, make sure that the correct length is specified.
Lamp Wattage	32 Watts	Some T8s are 36W. The 32W lamps are the correct choice for use with high-frequency ballasts.
Color Rendering Index (CRI)	At least 75	This ensures high quality lighting as well as high efficiency. When possible, choose lamps with CRI greater than 80.
Color Temperature	Depends on user preference 4000K lamps are preferred for maximum efficacy (lumens/Watt).	32-Watt T8 high-frequency lamps are available in 3000, 3500, 4000, 5000, and 6500 Kelvin color temperatures. They usually are referred to by names such as "Cool White."
Lamp Life	Minimum 20,000 hours rating	The rated life is the expected number of burn hours until 50% of the lamps have burnt out.

Procurement Checklist

- ❑ *Lamp/Ballast Compatibility:* Electronic ballasts must be specified to operate 32W high-frequency T8 lamps. Using a ballast not specified to operate a 32W high-frequency T8 lamp will reduce lamp life by as much as 50%.
- ❑ *Minimum Order Quantity:* Some manufacturers require a minimum order quantity for 32W high-frequency T8 lamps and electronic ballasts. Make sure you have enough storage space to handle minimum orders. Check with local suppliers and manufacturers and discuss the options.
- ❑ *Delivery Times:* Lamps and ballasts should be ordered at least two months before installation to allow time for delivery. Manufacturer delivery times could be as long as eight weeks.
- ❑ *Verification of the Technologies:* Upon purchase and delivery of the lamps and ballasts, purchasers (building owners and tenants) should inspect the shipment to verify the proper lamps and ballasts were delivered.
- ❑ *Replacement Lamp/Ballast Availability:* Purchasers should check with local suppliers for availability of replacement lamps and ballasts to be purchased in small quantities. Suppliers should stock adequate supplies (lamps and ballasts) to meet replacement orders by building owners and tenants. Make sure that lamps of the correct color temperature will be available. Occupants will see differences in color temperature, which may detract from their satisfaction.
- ❑ *Warranty:* The terms of the warranty should be discussed and understood by the purchaser. The discussion should include details about how quality problems will be addressed.



The United States Environmental Protection Agency has provided this guide through its International Technology Program (ITP). The goal of the ITP is to help organizations around the world profitably improve their energy efficiency and thereby reduce atmospheric emissions associated with the generation of electricity.

Contact: Gary McNeil, US EPA, mcneil.gary@epa.gov

Manila-Area Contacts for Procurement of 32-Watt Linear T8 Lamps and High-Frequency Electronic Ballasts

Philippines Office Building Energy Efficiency Project
US Environmental Protection Agency

About this List

This list is designed to assist with procurement of 32-Watt linear T8 lamps and high-frequency electronic ballasts. It provides contact information for lighting equipment manufacturers and suppliers around Manila. ITP does not specifically endorse any of the following companies or their products.

Lighting Equipment Manufacturers

The following companies have been identified as the lighting equipment manufacturers in Manila who offer both 32-Watt linear T8 lamps and high-frequency electronic ballasts.

Company	Contact Person	Contact Information
GE Lighting Philippines, Inc.	Ronald N. Razote	1873 P. Domingo St., 1207 Makati City Tel.: 895-7051 Fax: 890-8186 e-mail: ronald.razote@geasn.ge.com
OSRAM Phils. LTD. Corp.	Elmer E. Balderas	# 724 Moriones St. Cor. Juan Luna, Tondo, Manila Tel.: 243-9714-17 Fax: 243-9719 e-mail: saleseng@osram.com.ph
Philips Electronics & Lighting Inc.	Michael O. Rizarri	5/F Lighting Div., Philips House 106 Valero St. Salcedo Village Makati City Tel.: 8100-161 to 167 loc. 526 Fax: 816-6377 or 816-6340 e-mail: michael.o.rizarri@philips.com



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Contact: Gary McNeil, US EPA, mcneil.gary@epa.gov

Lighting Equipment Suppliers

The following companies have been identified by the lighting equipment manufactures as suppliers who are able to provide 32-Watt linear T8 lamps and high-frequency electronic ballasts.

Lighting Equipment Manufacturer	Lighting Equipment Supplier	Contact Person	Contact Information
GE Lighting Philippines, Inc.	AVESCO	Jess Gomez	Aurora Blvd. Cor. Yale st. Cubao, Q.C. Tel.: 912-8881 Fax: 929-9911
	Jeron Trading	Josephine Ong	Sta. Mesa Hts. Q.C. Tel.: 716-1973-74 Fax: 716-1974
	Ker & Co.	Boy Cruz	San Marcelino cor. Nalpil Sts., Manila Tel.: 536-8424
	Mega Standard	Senen Reaport	9th Ave. Kaloocan City Tel.: 365-8104 Fax: 365-8106
	Robust	Angel Lim	Binondo, Manila Tel.: 241-0879 Fax: 242-0123
	Summex Tdg.	Dina Dancen	Libertad, Pasay Tel.: 525-7643 Fax: 521-9156
OSRAM Phils. LTD. Corp.	(Contact Osram directly for supplier contacts)		
Philips Electronics & Lighting Inc.	A.G. International	Danny Tiu Adriano Garcia	1775 Adriatico St.,Malate Manila Tel.: 525-5283 / 525-6378 Fax: 525-5283
	CRML Enterprises	Manolo Buri	6908 Liwasang Estrella, Washington St., Makati City Tel.: 844-3483 / 844-7930 / 893-4089 Fax: 844-7311 / 805-4201
	JONRICH Enterprises Inc.	Richard Lim Cecille Gamotin	#61 Grace Bldg., Antonio Luna St. Cag. de Oro City Tel.: (08822)722-714 / (088)856-8580 Fax: (088)856-8579
	Starbright Sales Enterprises	Rosita Cu Clarence Cu Clement Cu Corwin Cu	477 San Juan de Letran St., Intramuros, Manila Tel.: 527-8288 to 90 Fax: 527-1735
	TRIGON Merchandising & Development Corp.	Flocie Romosod	JEMTEE Bldg., 677 Boni Ave. cor. Aliw St., Mandaluyong City Tel.: 532-8102 / 532-8125 / 532-0873 Fax: 533-5223